

**ABSTRACT OF THE DISCLOSURE**

A multivariable control system provides regulation for a plurality of control variables of interest based on selecting a particular one of the variables for regulation relative to a corresponding setpoint, while continuing to monitor the other variables and switching regulation control over to another one of the variables as needed to maintain all of them within their allowed ranges. The system includes one or more PID regulators that tune themselves for the particular variables selected for regulation control. In an exemplary embodiment, the control system is configured for controlling an alternative energy system, wherein it includes one or more power flow devices that control power flow between electrical energy storage devices (EESDs) and a common dc bus and/or power flow between the dc bus and an external ac electrical system.